AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions and listings in the application:

Listing of Claims

1. (Previously Amended) A method, comprising:

determining an apex of a cone from a trajectory of a photon emitted from an object to a point of intersection on a first detector;

determining an axis of symmetry of the cone from the point of intersection on the first detector and a point of intersection on a second detector;

determining a half-angle of the cone;

using a finite set of integrals dependent on the apex of the cone, the half angle of the cone, and the axis of symmetry of the cone to satisfy a completeness condition where:

i) if the finite set of integrals comprises surface integrals and if a plane that intersects a sphere with a radius bigger than a distribution where all the surface integrals emanates from the apex whose axis of symmetry is normal to the plane, then

obtaining a distribution of radioactivity from the surface integrals; or

ii) if the finite set of integrals comprises line integrals and if a plane that intersects a distribution where all the line-integrals emanates from the apex whose axis of symmetry is normal to the plane, then

obtaining a distribution of radioactivity from the integrated line-integrals; and

using the finite set of integrals for image reconstruction.

2. (Original) The method of claim 1, the apex of the cone comprising the point of intersection on the first detector.

3. (Original) The method of claim 1, the axis of symmetry comprising determining a scatter angle of the photon from the first detector onto the second detector.

4. (Original) The method of claim 3, the scatter angle ranging from 0° to 180°.

5. (Previously Amended) The method of claim 3, the half-angle of the cone comprising the scatter angle of the photon.

6. (Previously Presented) The method of claim 1, the step of calculating comprises providing Hilbert transforms on partial derivatives of a three-dimensional Radon transform.

7. (Original) The method of claim 1, the finite set of integrals of the cone comprising computing surface integrals of the cone.

8. (Original) The method of claim 1, the finite set of integrals of the cone comprising computing integrated line integrals of the cone.

9. (Original) The method of claim 1, the image reconstruction comprising implementing a two-step reconstruction method.

10. (Original) The method of claim 1, the object comprising a human.

11. (Original) The method of claim 1, the object comprising an animal.

12. (Original) The method of claim 1, the object comprising a nuclear facility.

13. (Original) The method of claim 1, the object comprising a missile.

14. (Original) The method of claim 1, the object comprising a nuclear waste site.

15. (Currently Amended) A method for image reconstruction, comprising:

~~calculating~~ obtaining a set of conical integrals to satisfy a completeness condition where:

i) if the set of conical integrals comprise surface integrals and if a plane that intersects a sphere with a radius bigger than a distribution where the surface integrals emanate from an apex whose axis of symmetry is normal to the plane, then

obtaining a distribution of radioactivity from the surface integrals; or

ii) if the set of conical integrals comprise line integrals and if a plane that intersects a distribution where the line integrals emanate from the apex whose axis of symmetry is normal to the plane, then

obtaining a distribution of radioactivity from the integrated line integrals; and

using the set of conical integrals for image reconstruction.

16. (Original) The method of claim 15, further comprising defining a cone from a trajectory of a photon from an object through a first detector and second detector.

17. (Original) The method of claim 16, the step of defining a cone comprising determining an apex, an axis of symmetry, and a half-angle of the cone.

18. (Canceled)

19. (Canceled)

20. (Original) The method of claim 15, further comprising calculating a Hilbert transforms on partial derivatives of a three-dimensional Radon transform.

21. (Original) The method of claim 15, the step of relating further comprising reconstructing an image.

22. (Original) The method of claim 21, the step of reconstructing comprising implementing a two-step reconstruction method.

23. (Original) The method of claim 21, the step of reconstruction comprising an ART-like or a SIRT-like reconstruction method.

24. (Original) The method of claim 21, the step of reconstruction comprising an ML-EM reconstruction method.

25. (Currently Amended) A method for image reconstruction, comprising:

~~calculating~~ obtaining a set of integrated line integrals to satisfy a completeness condition where if a plane that intersects a distribution where the set of integrated line integrals emanates from an apex whose axis of symmetry is normal to the plane, then the distribution of radioactivity from the integrated line integrals is determined; [[and]]

relating the set of integrated line integrals to a distribution of radioactivity; and

using the integrated line integrals for image reconstruction.

26. (Currently Amended) A method for image reconstruction, comprising:

~~calculating~~ obtaining a set of surface integrals to satisfy a completeness condition where if a plane that intersects a sphere with a radius bigger than a distribution where the set of surface integrals emanates from the apex whose axis of symmetry is normal to the plane, then the distribution of radioactivity from the surface integrals is determined; [[and]]

relating the set of surface integrals to a distribution of radioactivity; and

using the set of surface integrals for image reconstruction.

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27. (Previously Presented) A computer readable medium comprising instructions for:

calculating a set of conical integrals to satisfy a completeness condition where:

i) if the set of conical integrals comprise surface integrals and if a plane that intersects a sphere with a radius bigger than a distribution where the surface

integrals emanate from an apex whose axis of symmetry is normal to the plane, then

obtaining a distribution of radioactivity from the surface integrals; or

ii) if the set of conical integrals comprise line integrals and if a plane that intersects a distribution where the integrated line-integrals emanate from an apex whose axis of symmetry is normal to the plane, then

obtaining the distribution of radioactivity from the integrated line integrals.

28. (Original) The computer readable medium of claim 27, further comprising instructions for determining an apex and an axis of symmetry of a cone.

29. (Original) The computer readable medium of claim 27, further comprising instructions for calculating Hilbert transforms on partial derivatives of a three-dimensional Radon transform of the cone on the set of conical integrals.

30. (Canceled)

31. (Canceled)

32. (Previously Presented) The computer readable medium of claim 27, further comprising instructions for implementing a two-step image reconstruction.

33. (Previously Presented) A system, comprising:

a Compton camera;

at least two detectors coupled to the camera, the at least two detectors configured to obtain conical data to satisfy a completeness condition, where:

i) if a plane that intersects a sphere with a radius bigger than a distribution where surface integrals emanates from an apex whose axis of symmetry is normal to the plane, then a distribution of radioactivity from the surface integrals is determined; or

ii) if a plane that intersects a distribution where all integrated cone-beam line-integrals emanates from an apex whose axis of symmetry is normal to the plane, then a distribution of radioactivity from the integrated line-integrals is determined.

34. (Original) The system of claim 33, the camera being configured to move along a sine-on-cylinder curve.

35. (Original) The system of claim 33, the camera being configured to move along a circular path.

36. (Original) The system of claim 33, the at least two detectors comprising planar detectors.

37. (Original) The system of claim 33, the at least two detectors comprising a planar detector and a spherical-shaped detector.

38. (Original) The system of claim 33, the at least two detectors comprising a cylindrical detector and a spherical-shaped detector.

39. (Previously Presented) The system of claim 33, the at least two detectors comprising spherical-shaped detectors.